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(54) Adhesive bonding of garments

(57) A method of fabricating garments involves the application of a fluid, settable bonding agent to the edges of two pieces of fabric, or onto the surface of a single piece of fabric, or into a slit or perforation formed in a single piece of fabric, the bonding agent being such that, when set, it forms an elastomeric bond. Silicone based materials are generally suitable for use as the bonding agent. The invention is particularly useful with stretch fabrics.

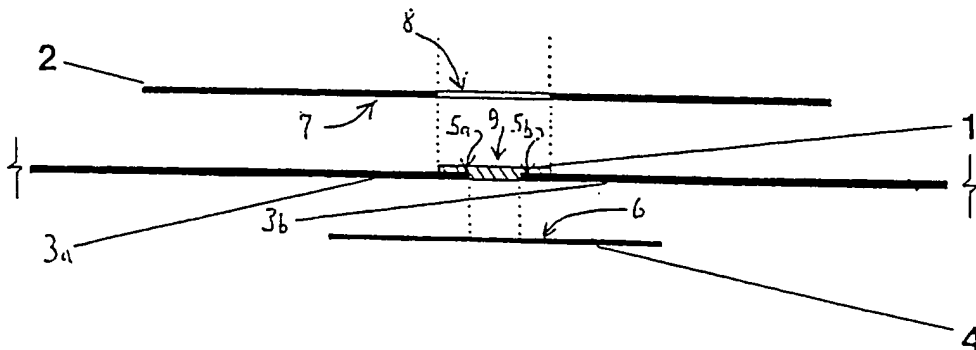


Fig 2

GB 2 316 353 A

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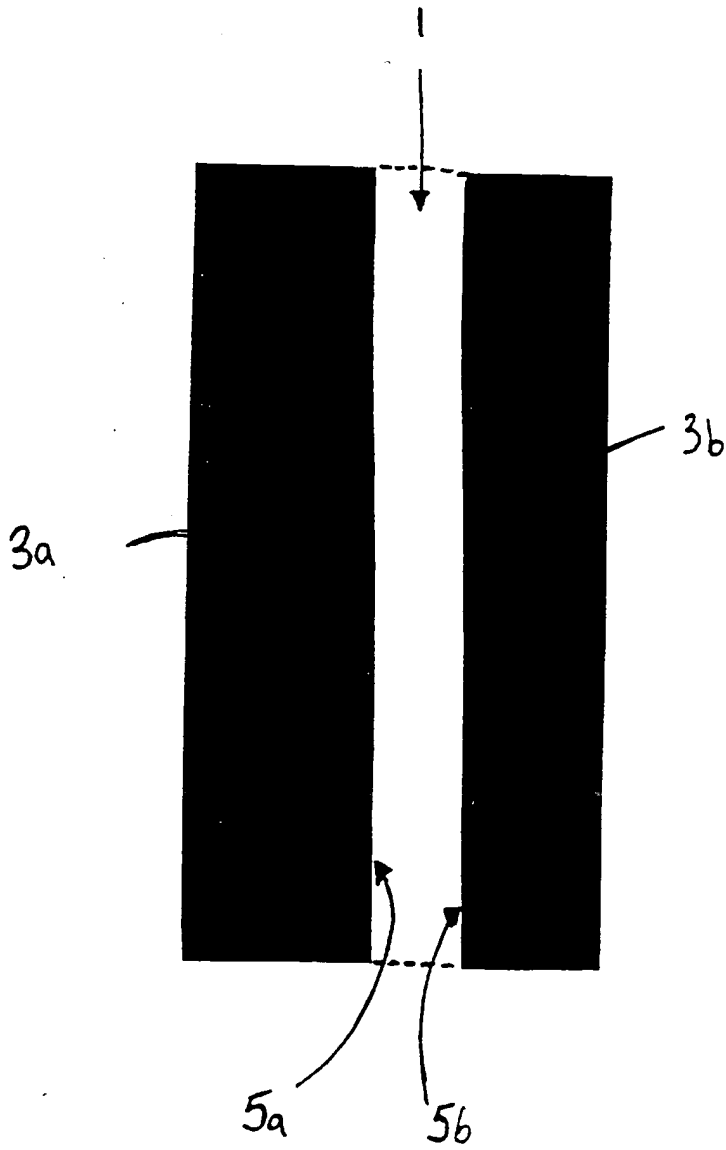


FIG. 1

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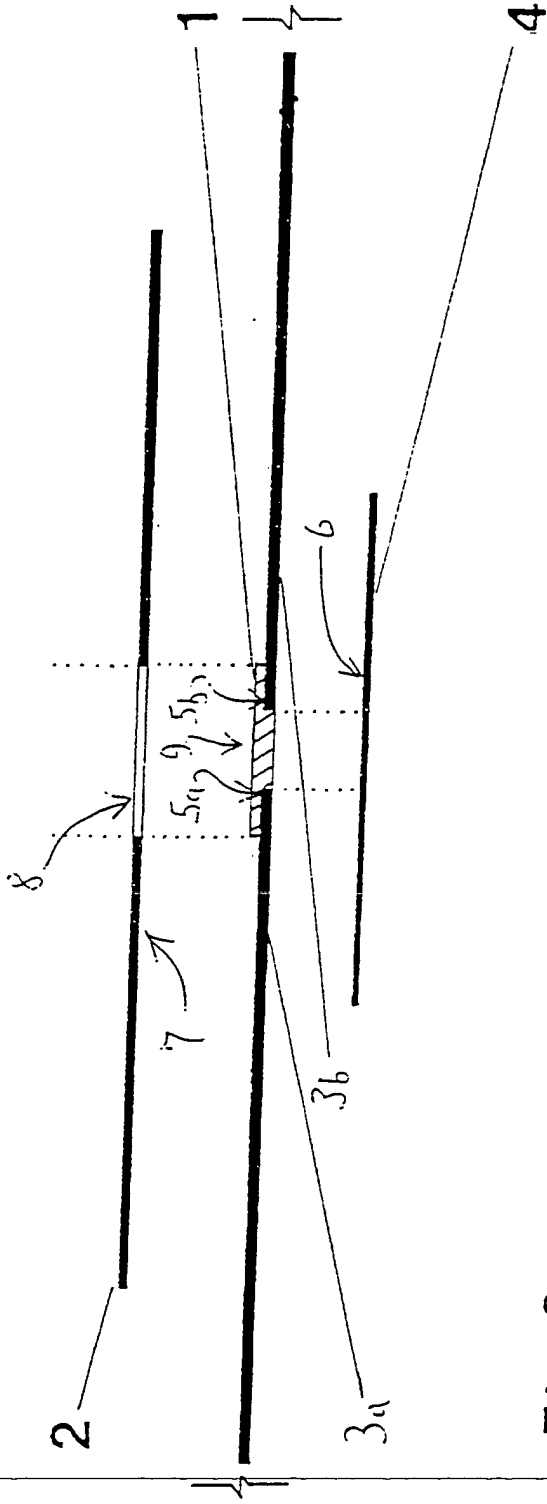


Fig 2

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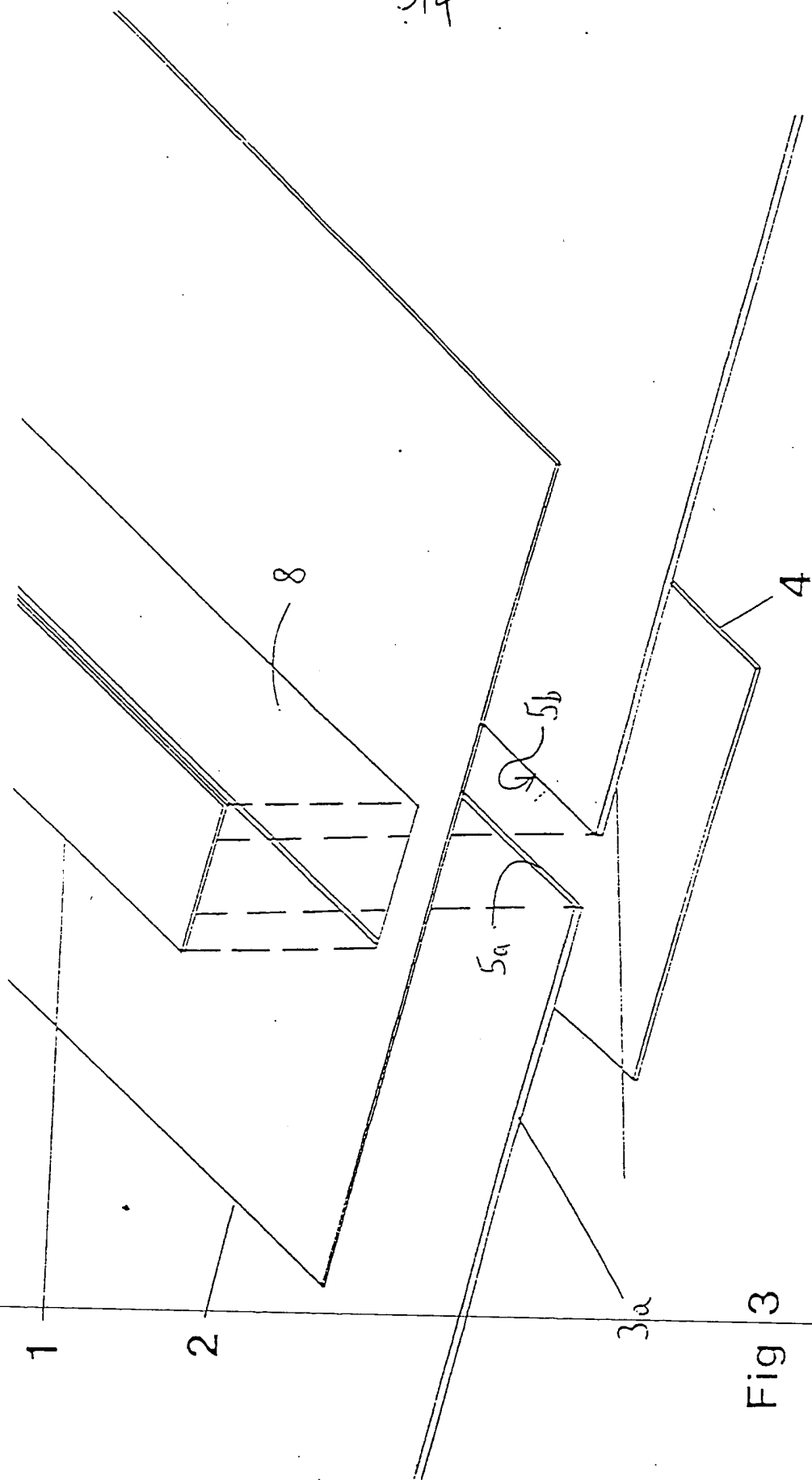


Fig 3

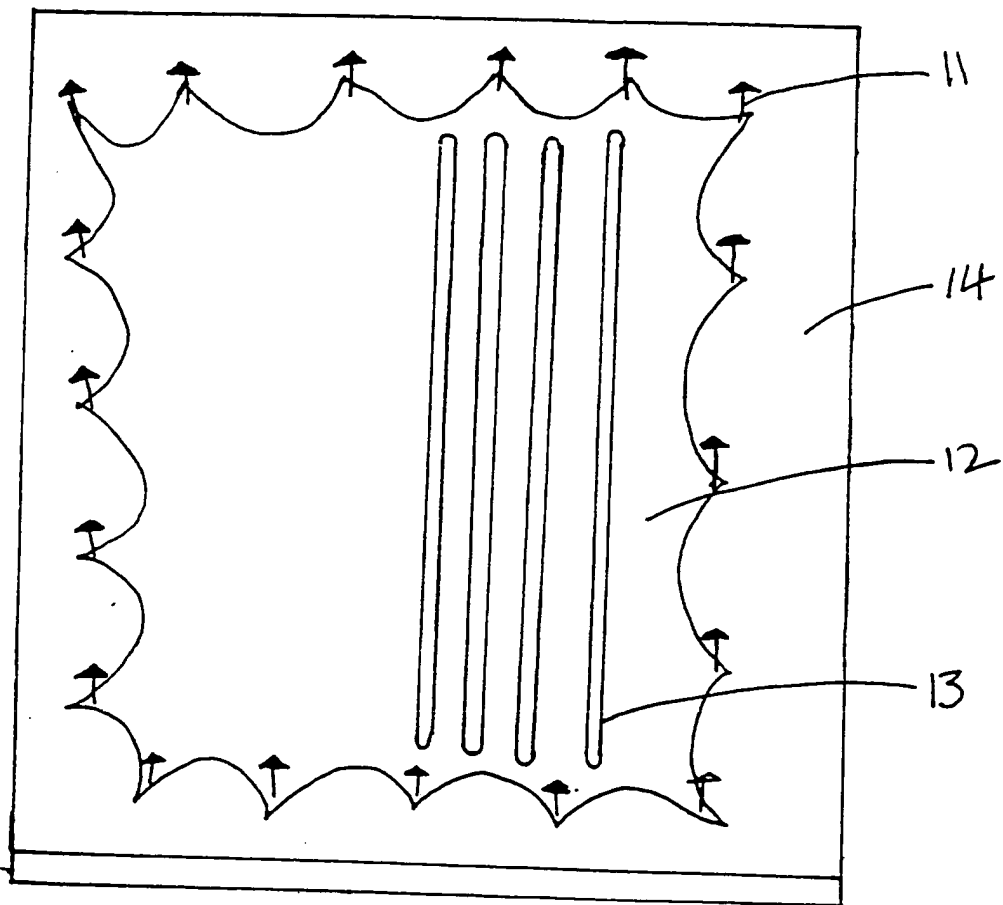


FIG. 4

IMPROVEMENTS RELATING TO GARMENTS

This invention relates to garments and to their construction.

5 Conventionally, clothing is fitted to the shape of the body by techniques such as forming darts, tucks, gathers (using, for instance, elastic thread) and seams in the fabric used to make the garment. The present invention is concerned with an alternative approach to  
10 garment construction (and decoration) which may be used alone or in conjunction with conventional techniques.

First Aspect

15 According to one aspect of the present invention, there is provided a method of fabricating a garment or a part of a garment, which comprises bonding two pieces of fabric together along adjacent edges by means of an elastomeric bonding agent.

20 Second Aspect

According to a second aspect of the present invention, there is provided a method of fabricating a garment or a part of a garment, which comprises: (a) positioning two pieces of fabric which are to form the  
25 garment or said part thereof so that edges of the respective pieces of fabric are adjacent to one another, but not necessarily in contact with one another; (b) applying a fluid, settable bonding agent to the edges of said two pieces of fabric and into any  
30 space defined between said edges, the bonding agent being such that, when set, it forms an elastomeric bond; and (c) causing or allowing said fluid, settable bonding agent to set, thereby joining said two pieces of fabric together.

35 Preferably, the edges of the pieces of fabric are spaced apart slightly - e.g. by a distance of from 1 to

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20mm - so that the elastomeric bond forms a visible part of the garment. This permits decorative effects to be achieved, e.g. by incorporating pigments into the bonding agent before or during its application to the edges of the fabric. In this way, uniform coloration of the elastomeric bond, or irregular veins of colour within it, can be achieved.

These methods are of particular (but not exclusive) application to the fabrication of garments from stretch fabrics, e.g. Lycra (Registered Trade Mark of Du Pont), or knitted fabrics.

A preferred technique for achieving bonding involves the use of a non-stick surface, e.g. a Teflon-coated metal plate, onto which the pieces of fabric are held; any desired spacing between the edges of the material can be readily achieved. A further non-stick, e.g. Teflon-coated, plate with an aperture corresponding to the area to be bonded is then placed over the edges of the fabric pieces, and the bonding agent is applied through the aperture in the second plate. The application of bonding agent can be achieved manually or mechanically, e.g. by means of a pumping system with or without means for spreading the fluid over the area defined by the aperture. A spatula having a non-stick (e.g. Teflon-coated) surface may be used to achieve an even spread of bonding agent. After application of the bonding agent, the second (i.e. apertured) plate is removed and the pieces of fabric may be left until the bonding agent has set.

### Third Aspect

According to a third aspect of the present invention, there is provided a method of fabricating a garment or a part of a garment, which comprises: (a) forming a slit or perforation in a piece of fabric from which the garment or said part thereof is to be formed;

(b) applying a fluid, settable bonding agent to the edges of said two pieces of fabric and into any space defined between said edges, the bonding agent being such that, when set, it forms an elastomeric bond; and  
5 (c) causing or allowing said fluid, settable bonding agent to set, thereby joining said two pieces of fabric together.

If desired, the edges of the perforation or slit may be held apart from one another, e.g by a few  
10 millimetres at the mid-point of the slit, in order to form a bead of elastomeric bonding material between the opposed edges of the slit. By providing a series of such slits or perforations in, for example, the bodice of a dress or swimming costume, and bonding them as set  
15 out above, the fabric is given a greatly enhanced capacity to stretch and conform to the body shape of the wearer. It therefore becomes possible to adopt an entirely different approach to garment design and fabrication. For example, instead of shaping a piece  
20 of fabric to fit the bust of the wearer, and then reducing the amount of material in the waist of the garment by cutting some of the fabric away, or by forming darts, it is possible by means of this invention to shape the garment to fit the waist of the  
25 wearer and then to provide beads, as described above, in the bust of the garment to permit the fabric to expand.

#### Fourth Aspect

30 According to a fourth aspect of the present invention, there is provided a method of fabricating a garment or a part of a garment, which comprises: (a) holding a piece of a stretch fabric in its fully stretched or partially stretched condition so that it  
35 is held at a first tension; (b) applying a fluid, settable bonding agent to the surface of the fabric,

the bonding agent being such that, when set, it forms an elastomeric bond; (c) causing or allowing said fluid, settable bonding agent to set, thereby joining said two pieces of fabric together; and (d) releasing  
5 the tension in said first fabric. In this way, decorative surface features may be formed on the fabric from which the garment is made.

Fifth Aspect

10 According to a fifth aspect of the present invention, there is provided a method of fabricating a garment or a part of a garment, which comprises: (a) holding a piece of a first fabric (which is a stretch fabric) in its fully stretched or partially stretched  
15 condition so that it is held under tension; (b) applying a fluid, settable bonding agent to the surface of the fabric, the bonding agent being such that, when set, it forms an elastomeric bond; (c) applying a piece of a second fabric to said surface of said first piece  
20 of fabric, the second fabric being either a stretch fabric held at a different tension to that of said first fabric, or being a conventional fabric; (d) causing or allowing said fluid, settable bonding agent to set, thereby joining said two pieces of fabric  
25 together; and (e) releasing the tension in said first fabric. It is not essential to ensure that all parts of the first fabric are tensioned to the same extent; likewise with the second fabric, where it too is a stretch fabric.

30 The second fabric may be the same as, or different from, the first; and the bonding agent may be applied over all, or just selected parts, of the surface of the first fabric. Also, the second fabric may be applied onto the first quite flat, or in a ruched or other non-  
35 flat condition.

With this embodiment, many different and

attractive effects may be achieved. For example, if the bonding agent is applied to the first, tensioned fabric in more or less regular lines spaced apart from one another and generally parallel to one another, and the second fabric is applied to the treated surface in a generally flat condition, the end result is a generally pleated appearance. By selecting the degree of tension in the first fabric, the spacing between the lines of bonding agent, and the nature and flatness (or otherwise) of the second fabric, many different visual effects may be achieved.

In all of the aspects described, the bonding agent is preferably a material which can be applied in fluid form and then treated, e.g. by the application of heat and/or pressure, or by exposure to air, to form a flexible, elastomeric solid. Silicone plastics of the type used as mastic sealants are generally suitable for this purpose, one example being the product Elastostil 43 produced by Wacker-Chimie GmbH of Berghausen, Germany. Such materials may be used as clear fluids or, with the incorporation of dyes/pigments, as coloured fluids.

#### Description of the Drawings

For a better understanding of the invention, and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:

FIGURE 1 illustrates two pieces of fabric joined together by the method of this invention;

FIGURE 2 shows an exploded view, in side elevation, of two pieces of fabric undergoing bonding in accordance with this invention;

FIGURE 3 shows an isometric view of the items seen in Figure 2; and

FIGURE 4 illustrates the fourth aspect of the invention as defined above.

Referring to the drawings, Fig. 1 shows two pieces of fabric 3a and 3b joined together by an elastomeric bond 1. Opposed edges 5a and 5b of the fabric pieces are spaced apart, their separation being approximately 8mm.

Figs. 2 and 3 show a preferred technique for producing a fabric bond such as illustrated in Fig. 1. The two pieces of fabric 3a, 3b are supported on a first plate 4 which has a non-stick (e.g. Teflon-coated) surface 6. A second plate 2 which has a non-stick (e.g. Teflon-coated) surface 7 and includes a strip-like aperture 8 is placed over the fabric pieces 3a and 3b, and a silicone bonding agent, e.g. Elastostil 43 from Wacker-Chemie GmbH of Berghausen, is applied through aperture 8 onto the edges 5a and 5b of the fabric and into the space 9 between them. As apparent from Figs. 2 and 3, aperture 8 is wider than the chosen gap 9 between the fabric pieces. By way of example, the aperture 8 can be about twice as wide as gap 9. This results in a fabric-to-fabric bond which extends somewhat beyond the limits of gap 9, as can be seen from Fig. 2.

In practice, mechanical techniques akin to screen printing may be used to apply the bonding agent through the aperture 8. After the application step is completed, upper plate 2 is removed and the bonding agent is caused or allowed to set. If left in air, the fabric may be moved after about 30 minutes, by which time the Elastostil 43 is touch-dry; it takes about ten hours to set to a condition which is fully dry on both sides and in which it firmly bonds the pieces of fabric together, forming an elastic bond which can stretch with the fabric. If heat and/or pressure is applied, the bond can be formed in much less time - e.g. about

ten minutes.

Referring next to Figure 4, pins 11 are used to stretch and attach a portion 12 of fabric (for example Lycra) to a board 14. Strips of bonding agent, e.g. Elastostil 43, are applied to the exposed surface of fabric 12 while it is in tension. When the bonding agent has set and fabric 12 is released from board 14, the fabric resumes its relaxed condition, with the result that the strips 13 of bonding agent are distorted into attractive shapes (not shown).

It will be appreciated that a further piece (not shown) of a fabric may be applied onto the strips 13 before they set, thus forming a laminated fabric whose appearance will depend on the nature of the second fabric and (if appropriate) the tension applied to it.

CLAIMS:

1. A method of fabricating a garment or a part of a garment, which comprises bonding two pieces of fabric together along adjacent edges by means of an elastomeric bonding agent.

2. A method of fabricating a garment or a part of a garment, which comprises: (a) positioning two pieces of fabric which are to form the garment or said part thereof so that edges of the respective pieces of fabric are adjacent to one another, but not necessarily in contact with one another; (b) applying a fluid, settable bonding agent to the edges of said two pieces of fabric and into any space defined between said edges, the bonding agent being such that, when set, it forms an elastomeric bond; and (c) causing or allowing said fluid, settable bonding agent to set, thereby joining said two pieces of fabric together.

3. A method according to claim 1 or 2, wherein the edges of said pieces of fabric are spaced apart slightly.

4. A method according to claim 3, wherein said edges are spaced apart by a distance of from 1 to 20mm.

5. A method according to any preceding claim, which includes the steps of: (i) supporting the pieces of fabric which are to be bonded together on a rigid, non-stick surface; (ii) placing over the pieces of fabric a rigid plate having a non-stick surface formed with an aperture corresponding to the area to be bonded; and (iii) applying the bonding agent through the aperture in said second plate.

6. A method according to claim 5, wherein the application of bonding agent through said aperture is effected mechanically.

7. A method of fabricating a garment or a part of a garment, which comprises: (a) forming a slit or

perforation in a piece of fabric from which the garment or said part thereof is to be formed; (b) applying a fluid, settable bonding agent to the edges of said two pieces of fabric and into any space defined between said edges, the bonding agent being such that, when set, it forms an elastomeric bond; and (c) causing or allowing said fluid, settable bonding agent to set, thereby joining said two pieces of fabric together.

8. A method according to claim 7, wherein the edges of the perforation or slit are held apart from one another in order to form a bead of elastomeric bonding material between the opposed edges of the slit.

9. A method of fabricating a garment or a part of a garment, which comprises: (a) holding a piece of a stretch fabric in its fully stretched or partially stretched condition so that it is held under tension; (b) applying a fluid, settable bonding agent to the surface of the fabric, the bonding agent being such that, when set, it forms an elastomeric bond; (c) causing or allowing said fluid, settable bonding agent to set, thereby joining said two pieces of fabric together; and (d) releasing the tension in said first fabric.

10. A method of fabricating a garment or a part of a garment, which comprises: (a) holding a piece of a first fabric (which is a stretch fabric) in its fully stretched or partially stretched condition so that it is held under tension; (b) applying a fluid, settable bonding agent to the surface of the fabric, the bonding agent being such that, when set, it forms an elastomeric bond; (c) applying a piece of a second fabric to said surface of said first piece of fabric, the second fabric being either a stretch fabric held at a different tension to that of said fabric, or being a conventional fabric; (d) causing or allowing said fluid, settable bonding agent to set, thereby joining

said two pieces of fabric together; and (e) releasing the tension in said first fabric.

5        11. A method according to claim 10, wherein the bonding agent is applied only to selected parts of the surface of the first fabric.

      12. A method according to claim 10 or 11, wherein the second fabric is applied onto the first fabric in a flat condition.

10       13. A method according to claim 10 or 11, wherein the second fabric is applied onto the first fabric in a ruched condition.

      14. A method according to any preceding claim, wherein the bonding agent is a silicone plastics material.

15       15. A method according to claim 14, wherein the bonding agent is Elastostil 43.

      16. A method according to any preceding claim, wherein the bonding agent has one or more dyes and/or pigments incorporated into it before or during its application to the fabric.

20       17. A fabric or garment produced by a method according to any preceding claim.



Application No: GB 9610757.8  
Claims searched: 1-17

Examiner: Paul Makin  
Date of search: 16 December 1997

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.O): B5K

Int CI (Ed.6): B29C 65/48

Other: Online : WPI

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X	US 5514470 (HAFFNER) see particularly column 4 lines 7-67.	1,2,3,9,10 ,11,12, 14,16
X	WO 95/18589 (PROCTER & GAMBLE) see particularly lines 13-18 on page 13 and elastomeric adhesive lamina 47.	1,14,16

X Document indicating lack of novelty or inventive step  
Y Document indicating lack of inventive step if combined with one or more other documents of same category.  
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